

REMARKS/ARGUMENTS

35 USC § 112

Claims 1 and 10 were rejected under 35 USC § 112, second paragraph, as being indefinite on various grounds. *The applicant agrees and amended claims 1 and 10* accordingly.

35 USC § 103(a)

Claims 1-13 were deemed to be obvious over Choudary (U.S. Pat. No. 6,384,285) in view of Siegel (U.S. Pat. No. 5,395,975). The applicant disagrees on various grounds.

With respect to Choudary, the applicant points out that the *present application (having serial number 10/678902) and U.S. Pat. No. 6,384,285 were, at the time the invention of the present application was made, owned by the "Council of Scientific and Industrial Research"*. Ownership of the '285 patent is reflected in the assignee information on the bibliographic section, while ownership of the present application is established in the attached assignment, which was filed with the PTO January 8, 2004. Therefore, the '285 patent should be disqualified as a 103 reference.

Even if one would consider the '975 reference as prior art, the applicant points out that Choudary neither presents any data on para-selectivity of isobutylacetophenone, nor mentions the use of solvent other than substrate. In contrast, the subject matter of the present claims allow up to 100% selectivity of p-isobutylacetophenone. This difference is far from being trivial. It should be appreciated that during the acylation reaction other isomers along with di- and tri- acylated products are also formed, which depends on the reaction conditions, and especially on the nature of solvent used. This is particularly true for the acylation reaction because the product formed (ketone) is more polar than the substrate (isobutylbenzene) and has the tendency to adsorb on the polar surface of the zeolite catalyst. The increased adsorption of the product on zeolite surface leads to di- and tri- acylated products and decrease in selectivity and conversion values resulting in the deactivation of the zeolite catalyst. The solvent of an appropriate polarity will compete with the adsorption of the product on zeolite surface and reduces the adsorption of the product on zeolite surface and thereby enhancing the conversion and selectivity values. In the present

application, the applicants have distinctly observed the role of a polar solvent (*e.g.*, nitrobenzene and ortho dichlorobenzene) for achieving higher conversion and selectivity values.

Furthermore, U.S. Patent No. 6,384,285 is concerned with acylation of isobutylbenzene using a zeolite catalyst, and more specifically nano-crystalline, microcrystalline and metal exchanged zeolite beta, having the particle size of 10-100 nm and 1-50 micron respectively. In contrast, the present inventive subject matter does not require any restriction on the crystallinity and particle size of the catalyst. Thus, any conventional method for synthesis of zeolites can be employed to prepare zeolite Beta, the starting material for preparing the exchanged catalyst.

Additionally, the Chaudhary et al conversion is reported under nitrogen atmosphere only. On the contrary, the catalyst prepared according to the present inventive concept does not require an inert atmosphere and can be successfully prepared under normal atmospheric conditions. Therefore, the presently claimed subject matter is patentably distinct from the '975 reference in terms of the catalyst, reaction conditions used, and selectivity toward para-product.

With respect to the Siegel reference (U.S. Patent No. 5,395,975), the applicant points out that Siegel teaches use of selected metal compounds, and particularly iron salts, which clearly teaches away, if not even against the claimed subject matter. Therefore, Siegel should not be considered a proper reference for an obviousness rejection.

More specifically, Siegel teaches the preparation of polyacylated aromatic compounds by reacting substituted benzenes, especially, tri or tetra-C1-C4-alkylacylbenzenes with carbonyl chlorides as acylating agents in presence of homogenous catalyst viz. Fe₂O₃, ZnCl₂, SnCl₄ and MoO₃. There is no teaching or suggestion in the '975 reference to use Zeolites as catalysts, which are well known to have chemically and catalytically distinct properties as compared to the reference's metal compounds. It should be noted that it is not obvious to a person skilled in art how to adjust the reaction conditions to afford the desired substitution. In fact, the substances being added to the reaction mixture do not essentially govern the position of incoming group, but it is the functional group already present in the benzene ring which governs the position of the incoming group. Therefore, Siegel clearly fails to teach or suggest the subject matter as presently claimed.

In view of the present amendments and arguments, the applicant believes that all claims are now in condition for allowance. Therefore, the applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

RUTAN & TUCKER

By 

Martin Fessenmaier, Ph.D.

Reg. No. 46,697

Tel.: (714) 641-5100